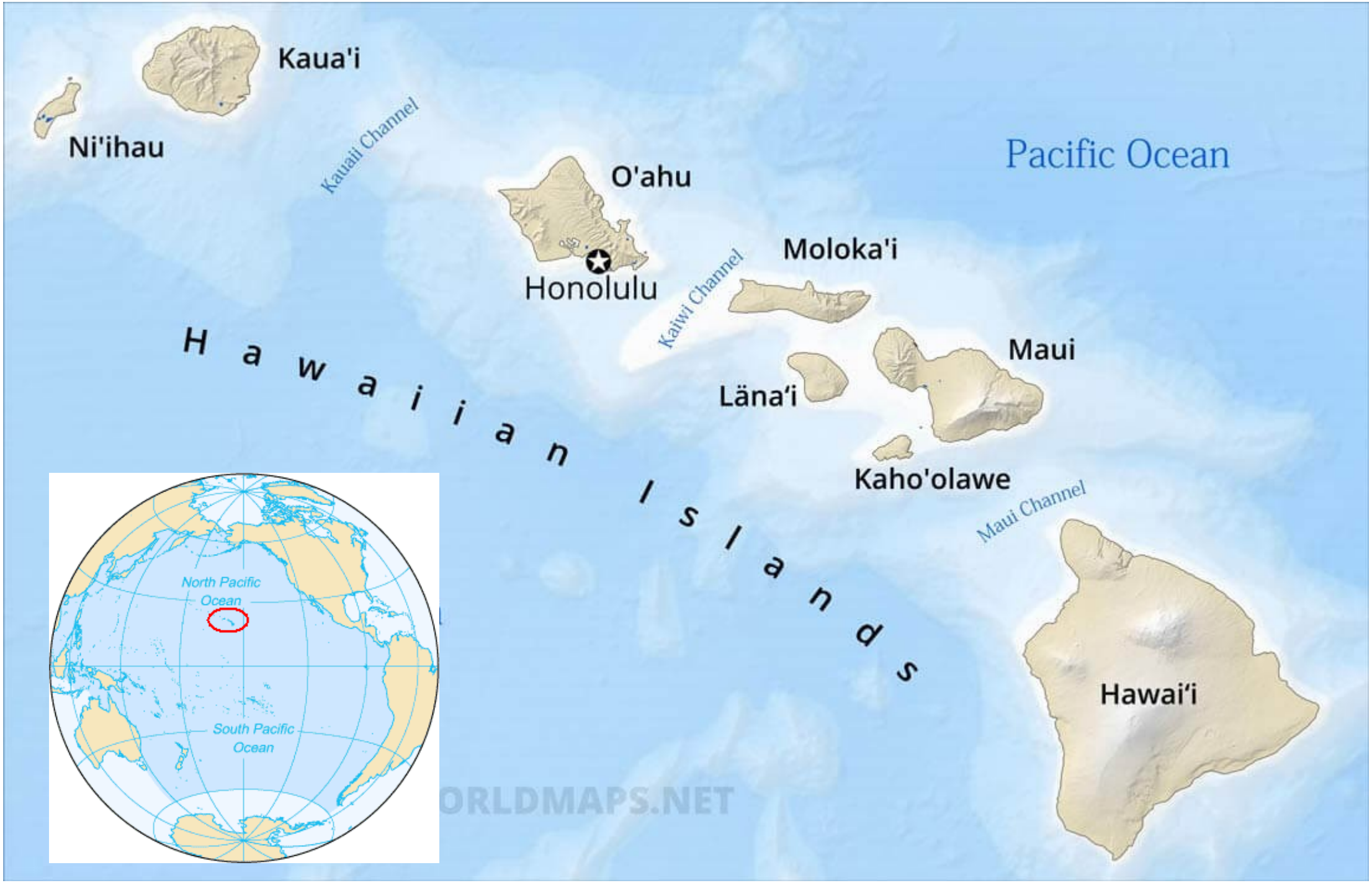
Identifying onsite solutions for a remote community in Hawai‘i: a community-centered approach to navigating a complex wastewater challenge



Stuart Coleman (WAI)
Scott Crawford (TNC)
Craig Nelson (UHM)
Sean Swift (UHM)
Jos Hill (TNC)

Dr. Kim Falinski, The Nature Conservancy Hawai’i and Palmyra Chapter

Gabby Saba & Nicolas Storie, Wastewater Alternatives & Innovation (WAI)

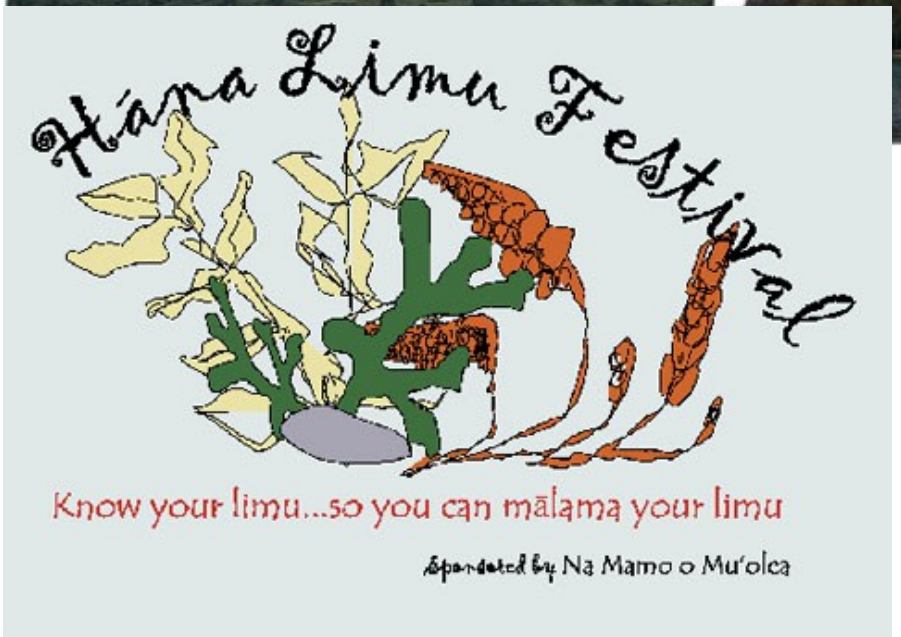

Kaua'i
Ni'ihau
Kauaii Channel
O'ahu
Honolulu
Pacific Ocean
Moloka'i
Kaiwi Channel
Maui
Läna'i
Kaho'olawe
Maui Channel
Hawai'i
H a w a i i a n I s l a n d s
North Pacific Ocean
South Pacific Ocean
WORLDMAPS.NET

Problem: Excess nutrients negatively affect macroalgae



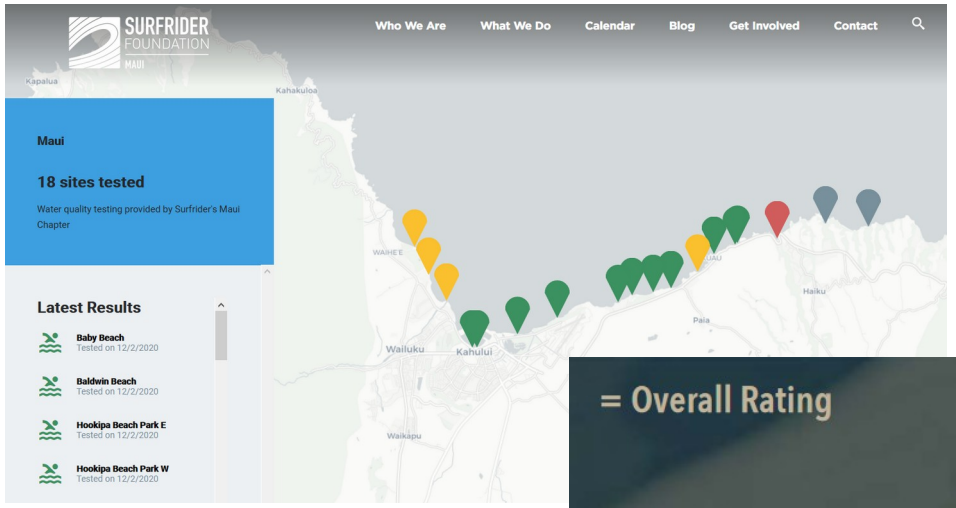


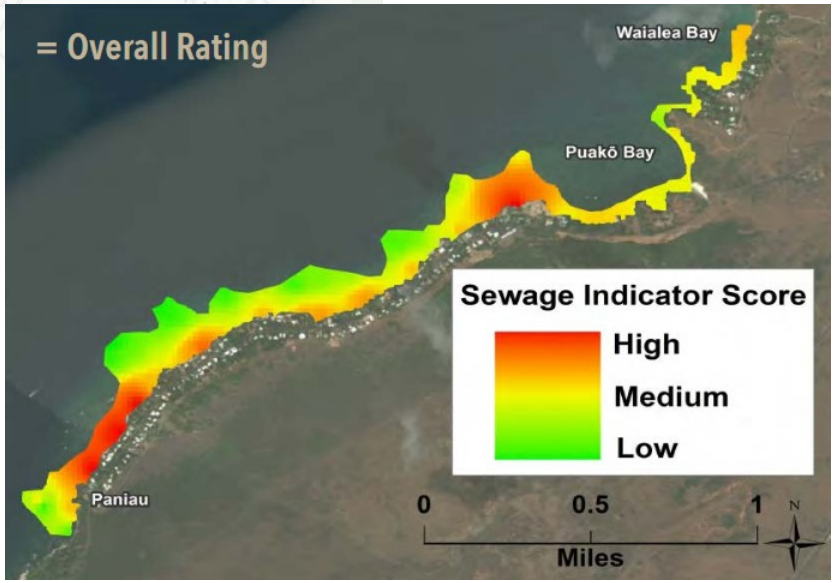


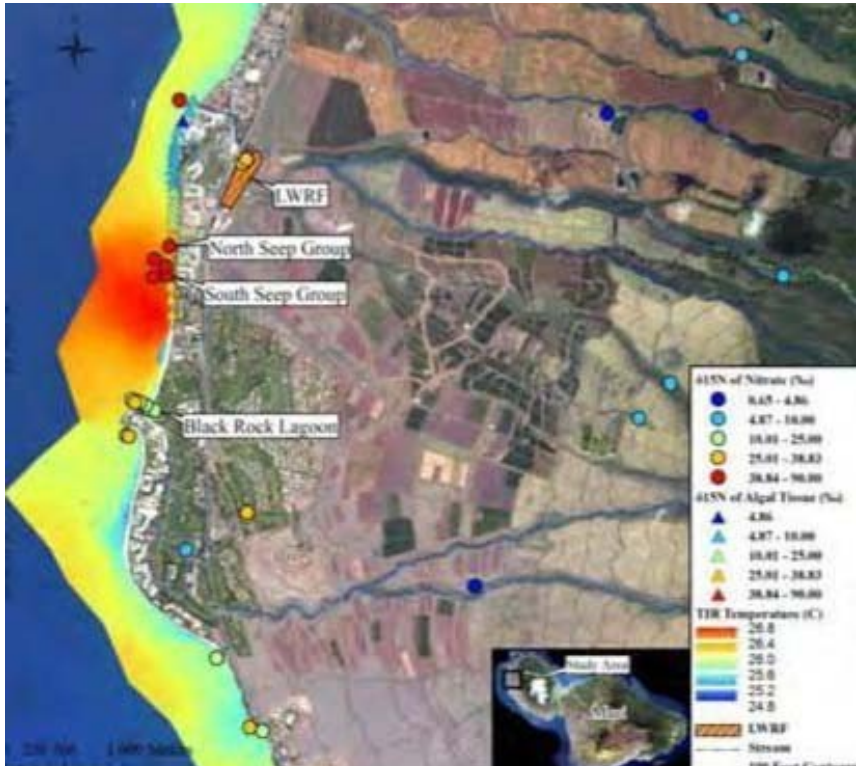




Nutrient and contaminant pollution is widespread – important beaches, reefs and wetlands



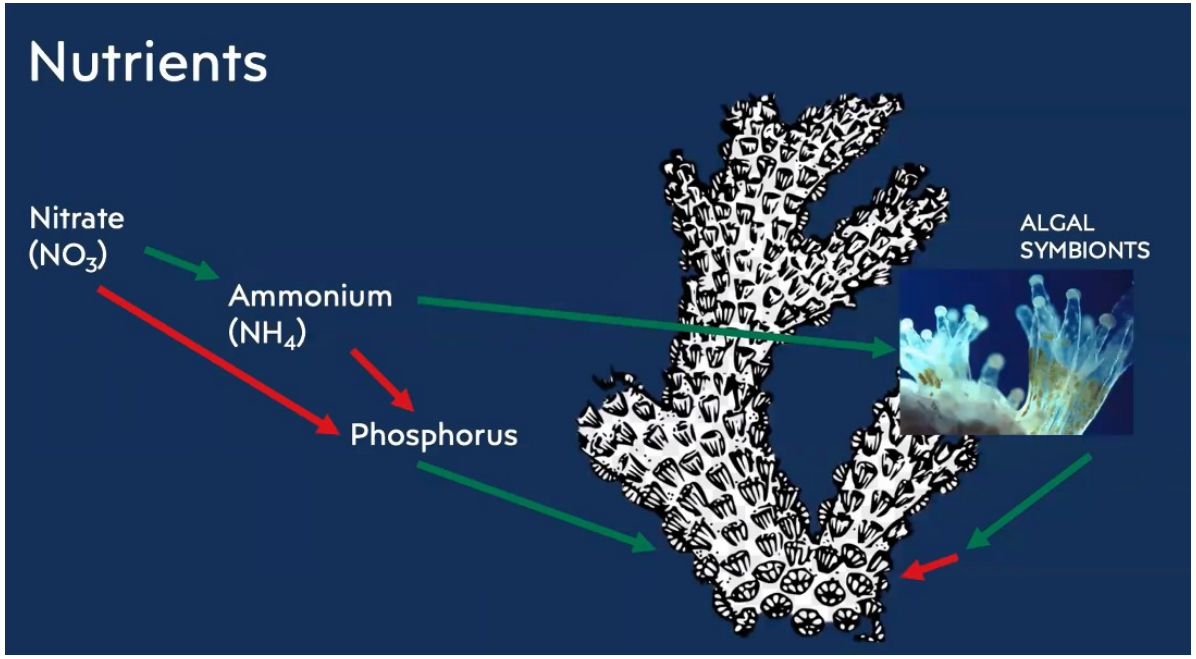


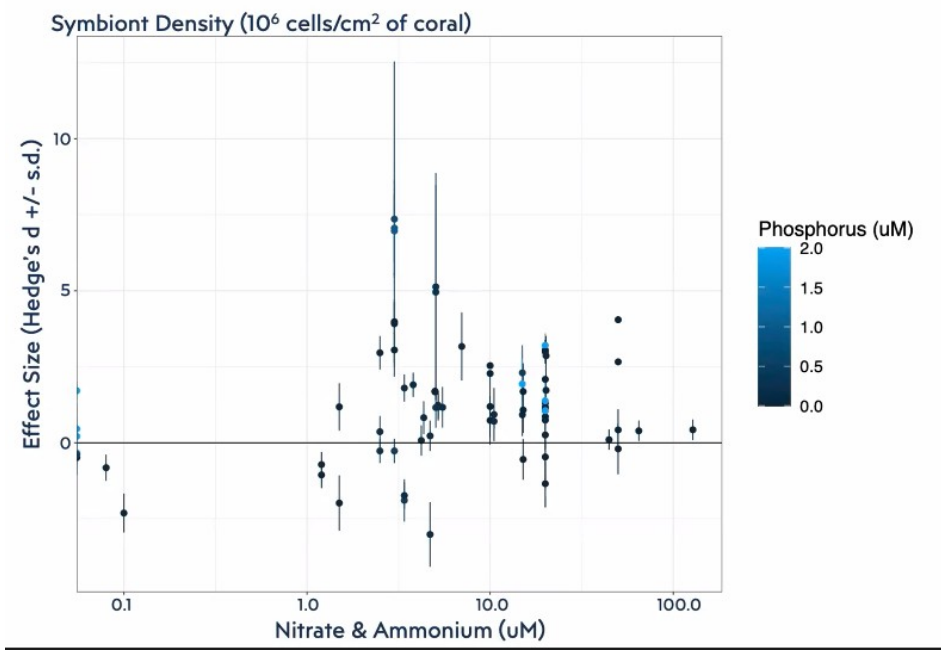




kim.falinski@tnc.org

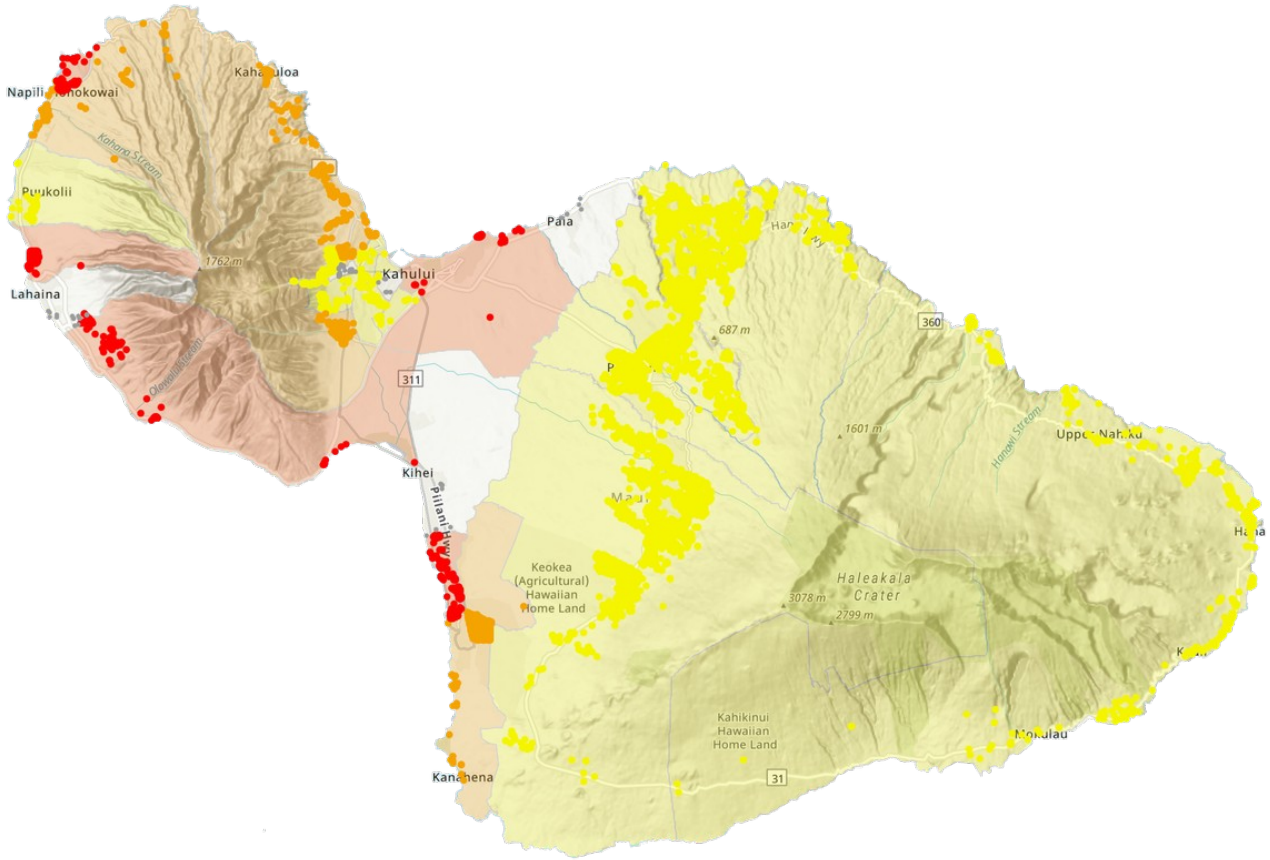
Problem: Excess nutrients negatively affect corals





Coral symbionts decrease after ~100 ug/L of inorganic nitrogen.
Sources: Cesspools, agriculture, wastewater injection

Maui Cesspool Priority Areas Map



11,000+ cesspools

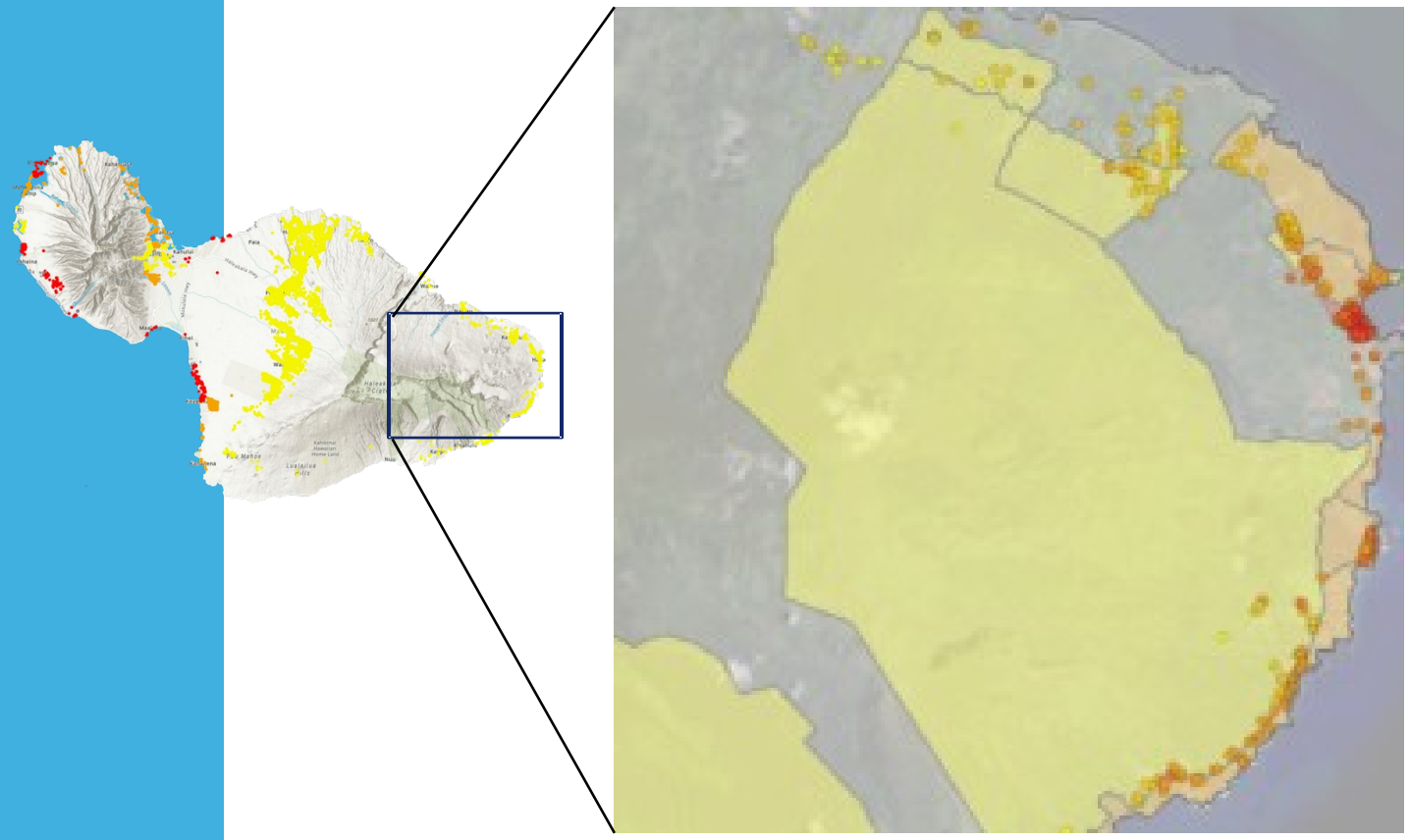
[Sea Grant Prioritization Tool Website]

Scan QR Code Here

Priority Level 1: Greatest contamination hazard
Priority Level 2: Significant contamination hazard
Priority Level 3: Pronounced contamination hazard

Priority Area: East Maui

As defined by Hawai‘i Department of Health

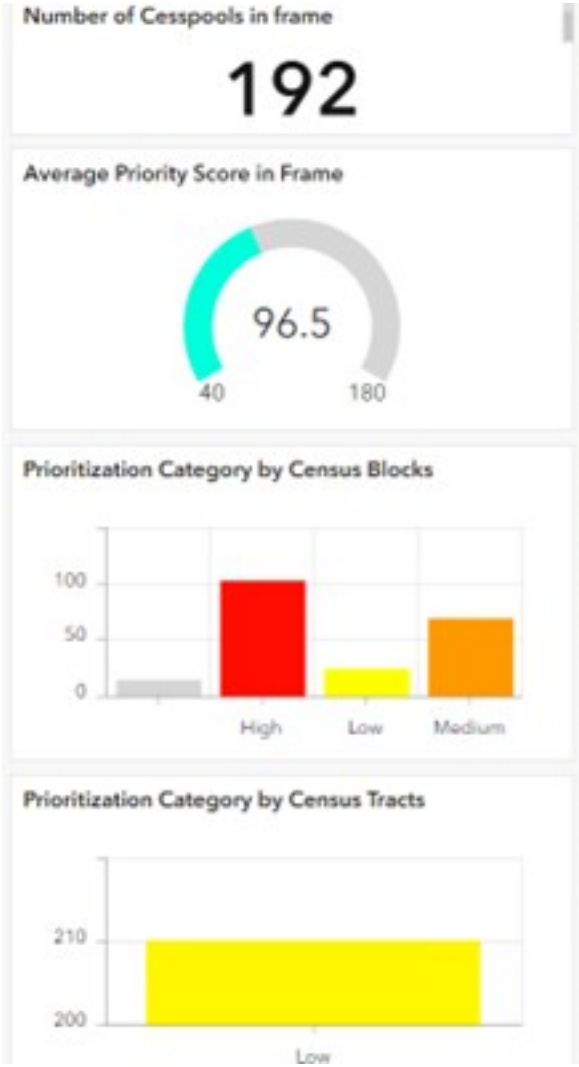


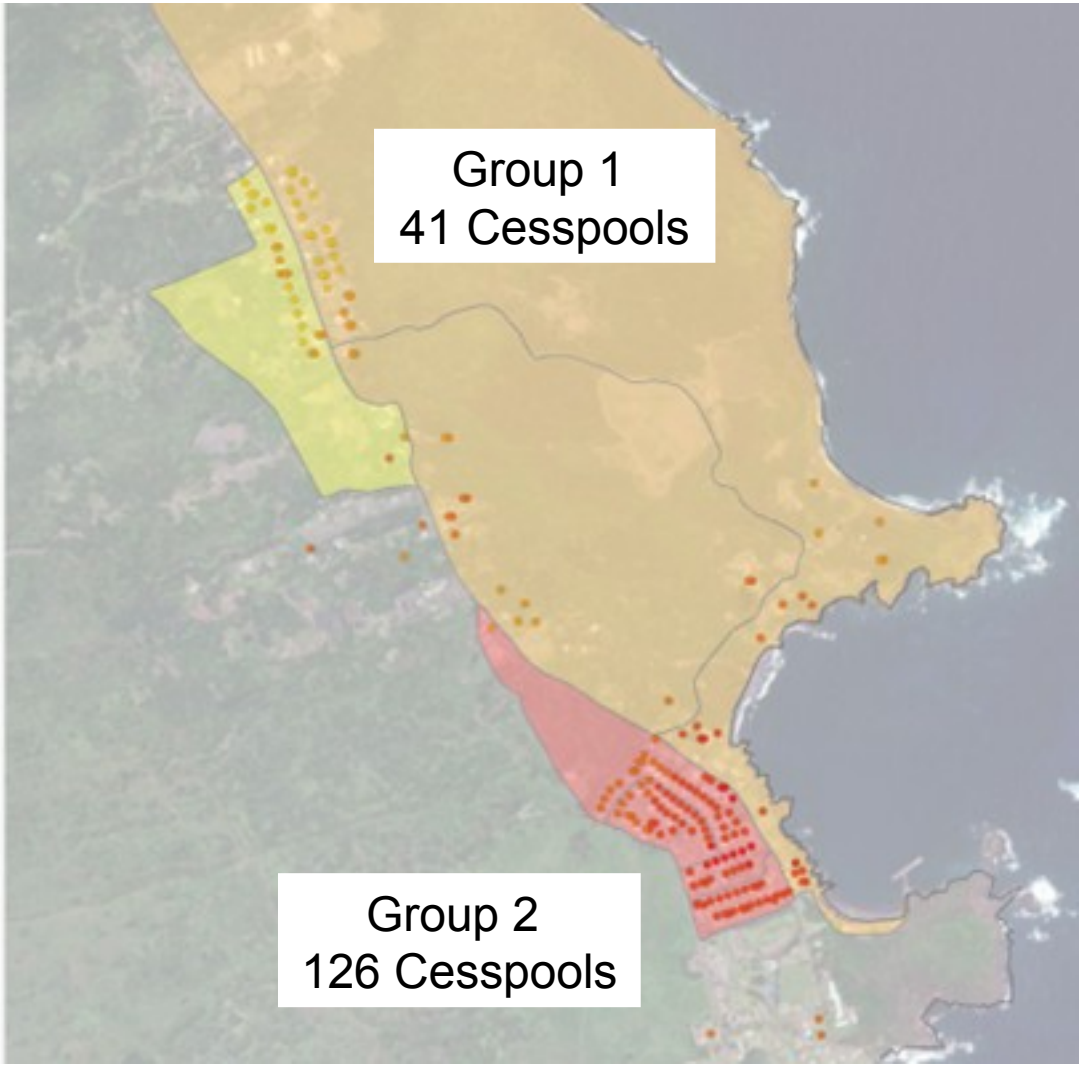
~539 cesspools

Priority Level 1: Greatest contamination hazard
Priority Level 2: Significant contamination hazard
Priority Level 3: Pronounced contamination hazard

Priority Area: Hana

As defined by Hawai'i Department of Health





Priority Focus:
Subdivision
50 cesspools within 1/8th mile

East Maui's unique geology and population

- Newly formed basalt
- Highly porous soils
- ~75 in rain/year – "white rain"
- 2-yr storm is 6-8 in
- Small population – 1,000 to 2,000 people, >70% Native Hawaiian
- Subdivision slope average of 10%





Hana Subdivision

- Rural community- 2 h drive on unstable highway to nearest pump out station
- Small lot size (average <10,000ft^2) with multi-generation homes



01	Make the Case	• Water quality and biological monitoring • Public health surveys
02	Investigate Tech Solutions	• Collaborate with EPAs HI-CAWAG process • Co-develop preliminary tech solutions
03	Form a Governance Structure	• Build an advisory council • Consider Responsible Management Entity (RME)
04	Finance and Build Out	• Continue community engagement • Explore finance options

How to assess and engage community support?

- *Secret*: *Engage community broadly, with wastewater as a piece of the puzzle*



- Make the Case

‘Opihi

- Native limpets are key biocultural species
- Community building to protect coastal populations

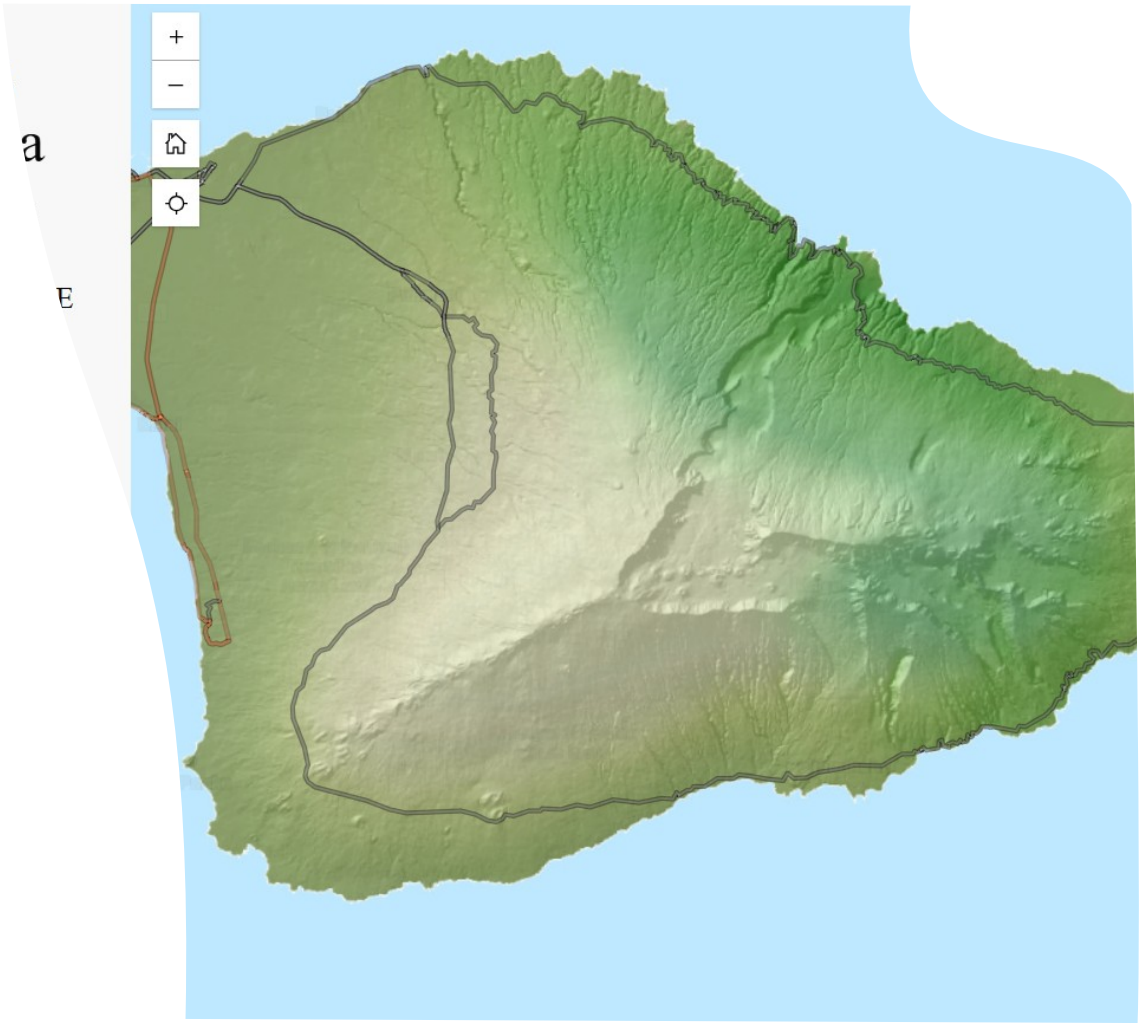




- Make the Case

Mapping and Data Collection: Is wastewater pollution evident in coastal waters?

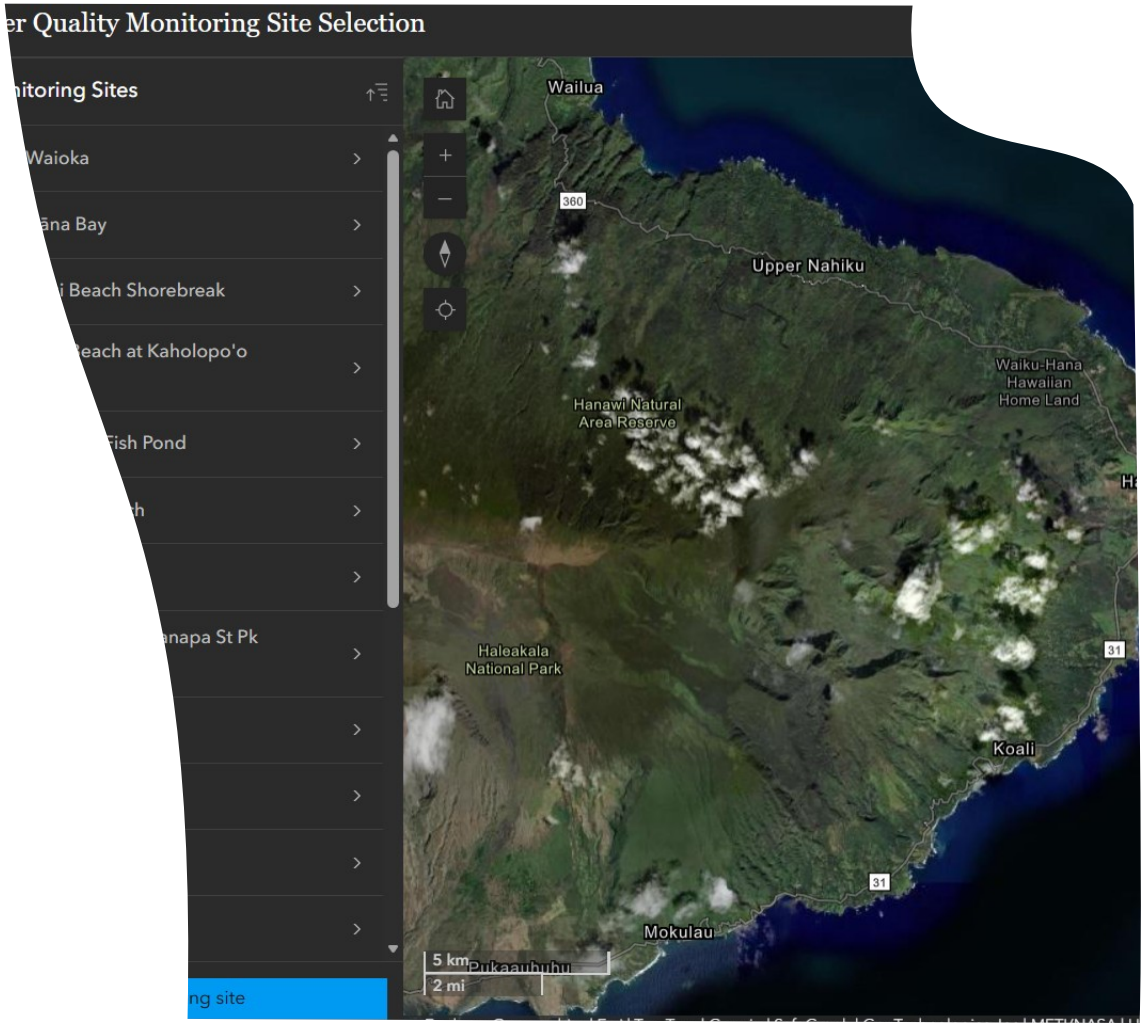
- Community informed sampling sites
- Smith lab 2009 isotope results



- Make the case

Water quality mapping

- Tool developed for community members to report where they are interested in water quality issues



- Make the case

Wastewater Assessment at 30 Co-Developed Sites

- Once sites were chosen, partners at Univ of Hawaii at Mānoa sampled over 3 days at all priority sites



- Make the case

Wastewater Assessment at 30 Co-Developed Sites

- Parameters included pharmaceuticals, fecal indicator bacteria, nutrients and other novel tracers for wastewater



- Identify solutions

What solutions are available?



Supporting a CAWAG- Closing America's Wastewater Gaps process in Hawai‘i

- Identify solutions



- Community meetings between November 2025 through June 2026 to develop solution set and present results

Supporting a CAWAG- Closing America's Wastewater Gaps process in Hawai‘i

- **Project Goal**: Develop a community-informed wastewater solutions plan, identify funding sources, and support applications for cesspool conversions and infrastructure improvements.

• Identify solutions

WAI WASTEWATER ALTERNATIVES & INNOVATIONS

supported Hāna with education, outreach, and technical assistance focused on cesspool conversion and wastewater planning.

carollo®

prepared a Preliminary Engineering Report (PER) evaluating centralized, decentralized, and nature-based treatment options.



• Identify solutions

Identifying top community concerns & alternatives

Directions:

- Each member was given 3 stickers.
- Vote for **top 3 cesspool conversion priorities and top 3 cesspool conversion alternatives**
- Write questions or feedback on each category!

Cesspool conversion priorities:

- Construction cost
- Annual operation & maintenance (O&M) cost
- Responsibility for O&M cost
- Compliance with legislative requirements
- Utilization & availability of land
- Environmental concerns

Cesspool conversion alternatives:

- 1A= Gravity Decentralized
- 1B= Low-Pressure Decentralized
- 2A= Individual + Gravity Decentralized
- 2B= Individual + Low-Pressure Decentralized
- 3= Individual
- 4= STEP Decentralized

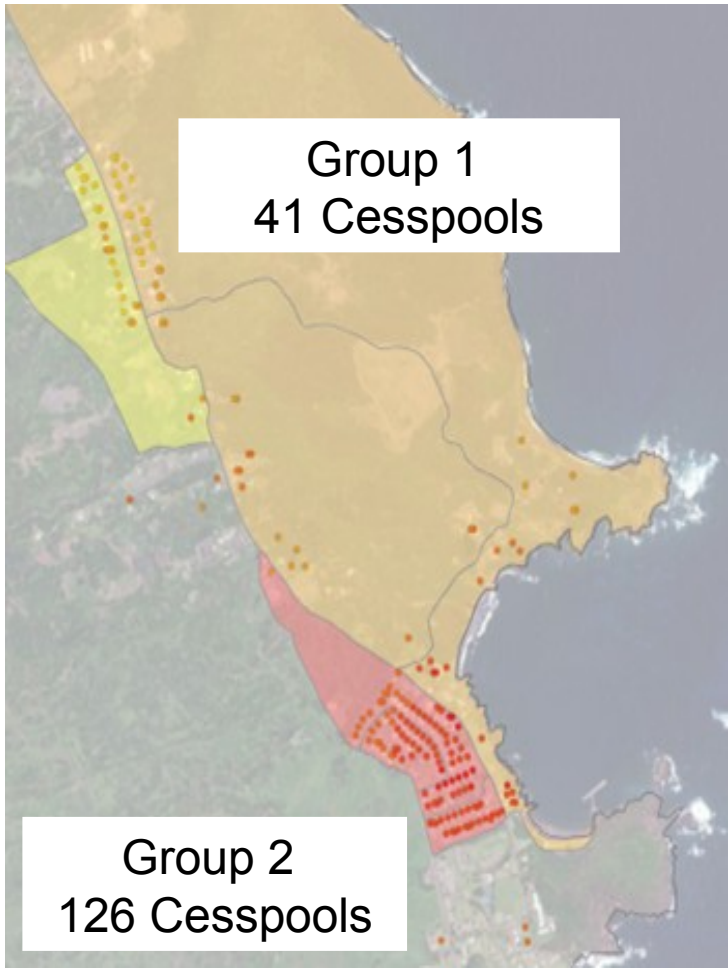
Strong interest in local training, jobs, and ensuring Hāna has qualified operators and maintenance staff.

WAI WASTEWATER ALTERNATIVES & INNOVATIONS

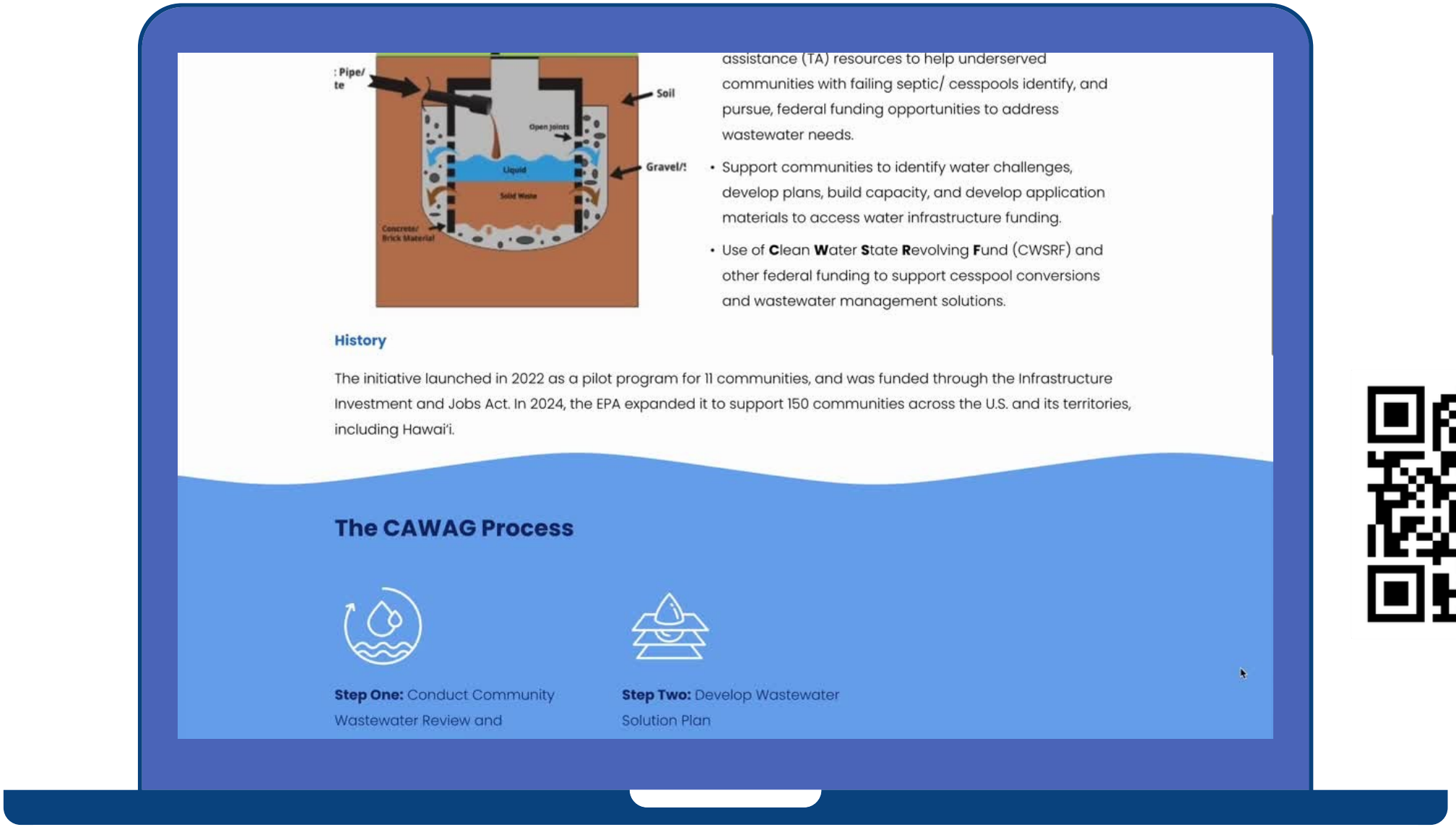
Supporting a CAWAG- Closing America's Wastewater Gaps process in Hawai'i

- Identify solutions

Alternative	Group 1 (41 cesspools)	Group 2 (126 cesspools)	Others
1A	Decentralized WWTP Gravity Sewer	Decentralized WWTP Gravity Sewer	IWS
1B	Decentralized WWTP Low Pressure Sewer	Decentralized WWTP Low Pressure Sewer	IWS
2A	IWS	Decentralized WWTP Gravity Sewer	IWS
2B	IWS	Decentralized WWTP Low Pressure Sewer	IWS
3	IWS	IWS	IWS
4	STEP	STEP	IWS



• Identify solutions



Hana Project Website

https://www.waicleanwater.org/cawag

WAI WASTEWATER ALTERNATIVES & INNOVATIONS

• Governance Models

Who will manage it?

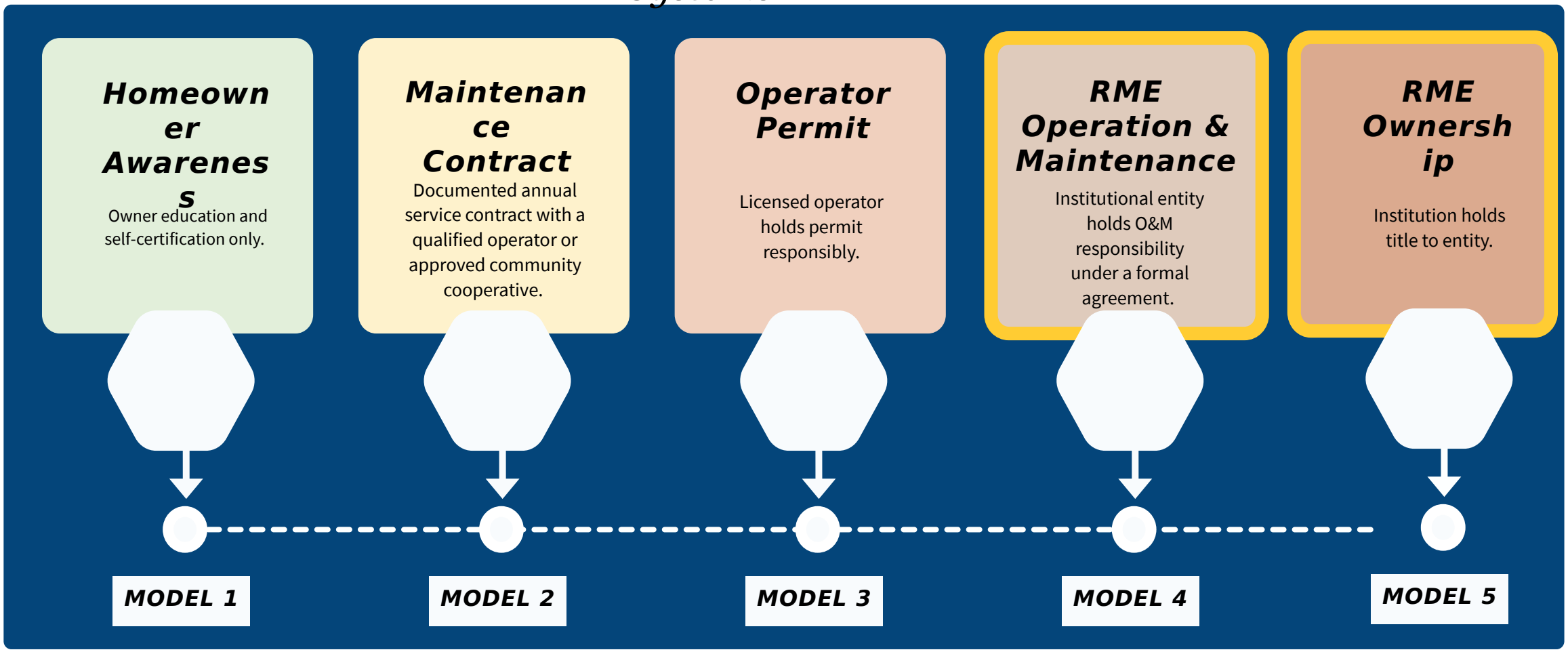
Developing a management plan



• Governance Models

EPA MANAGEMENT MODELS

**For Managing Onsite and Clustered Decentralized Wastewater Treatment Systems*



WAI WASTEWATER ALTERNATIVES & INNOVATIONS

EPA Management Models in an Island Context

- Governance Models



Link to Guidelines

*Based on Cesspool Conversion Prioritization Tool
** O&M= Operation & Maintenance

Responsible Management Entity (RME)

- Governance Models

Public Agencies

NGO

Service Providers

RMB

Community & Cultural Leaders

Resource Protection

Regulatory Authority

"An organization consisting of diverse stakeholders with technical, managerial, and financial capacity to operate and maintain viable decentralized wastewater systems within the RME's jurisdiction."

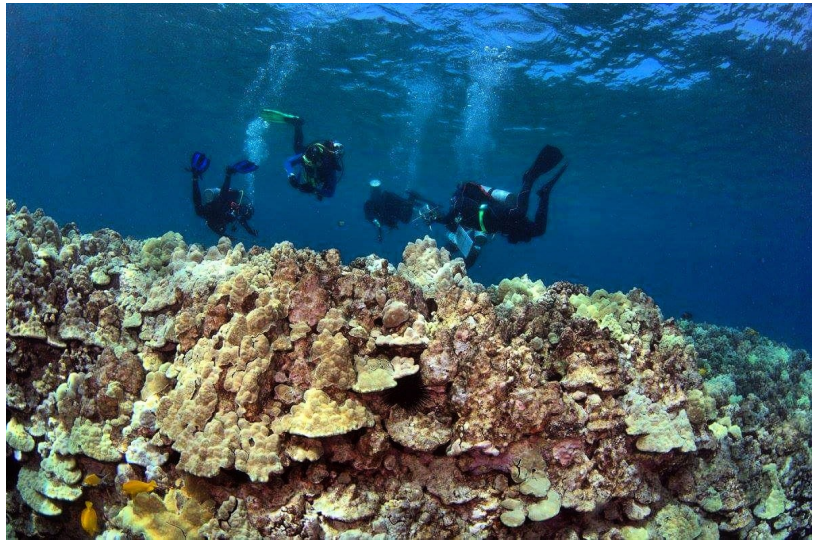
***Develop a community & place-based framework suited for Hawai'i**

WAI WASTEWATER ALTERNATIVES & INNOVATIONS

- Governance Models

Why RMEs in Hawai‘i?

- Sensitive Ecosystem & Cultural Landscapes
- Rural Communities & Limited Infrastructure
- Access to Finance & Funding Support
- Innovation & Diversification
- Sustain & Scale





• Governance Models

HiRME COLLECTIVE

Program Overview

Hawai‘i’s Responsible Management Entity (HiRME) Initiative* brings together stakeholders across Hawai‘i to transform decentralized wastewater management.

Through targeted engagement, we will establish RMEs in key counties to address pressing capacity needs for decentralized systems infrastructure and long-term management.

Three Core Objectives

Stakeholder & Community Training
Develop a specialized training course to provide customized wastewater management curriculum for diverse stakeholders.

Technical Asssistance to Build RME Capacity
Provide technical and professional expertise to build RME capacity for cesspool conversions and long-term management targeting rural areas with a high cesspool density.

Outreach & Education
Lead a strategic outreach campaign to boost public awareness with community meetings & workshops and tailor sustainable wastewater resources for Hawai‘i’s rural and Native Hawaiian communities.

This program is supported through the EPA’s Rural, Small, and Tribal (RST) grant program, but is not part of the CAWAG program.

WAI WASTEWATER ALTERNATIVES & INNOVATIONS

• Governance Models

WHAT ACTIVITIES CAN A RME DO?

Administration	*Installation*	*Operation & Compliance*
Public Education	**Site Evaluation**	**Operation & Maintenance**
Planning	**System Design**	**Residuals Management**
Performance Requirements	**Construction & Installation**	**Training & Certification / Licensing**
Recordkeeping & Reporting		**Inspections & Monitoring**
Financial Assistance		**Corrective Actions & Enforcement**

WAI WASTEWATER ALTERNATIVES & INNOVATIONS

Hāna Conversion Next Steps

- Establish Governance

Enroll stakeholders into HiRME Training launching in January 2017 & provide technical assistance to establish an RME

Workshops will be offered virtually and/or in person

1. **Initial Scoping & Outreach**

   Set goals and measurable outcomes, identify core stakeholders and roles, and common needs.

2. **Developing a community profile**

   A detailed region profile and system inventory to ground our strategies in reality.

3. **Technical evaluation of the community profile**

   Evaluate core purpose, define management intent, finalize data inventory.

4. **Financial Capacity**

   Identify funding source, financial capacity building, capital investment planning.

5. **Planning the RME Model**

   Define model, establish steering committee, development mission statement, obtain legal agreements.

6. **Developing the RME Business Plan/Governance Structure**

   Business Model, Agreements, and Operating Costs.

7. **CWSRF Application**

   Deep diving into the Clean Water State Revolving Fund and maximize low-interest funds.

8. **Maintain & Implement**

   Meet funding requirements, document program successes, develop foundational organzational docs, finalize legal filings and aquire sustainable funding.

WASTEWATER MANAGEMENT IS A KEY CHALLENGE AND OPPORTUNITY

- Low cesspool conversion rates
  - Workforce bottleneck
  - Expense of conversions
- Technology implementation – need for better than septic
- Lack of data on where private injection wells are
- Lack of reuse policy recommendations for small private owners

- Hawai‘i could be a leader in sustainable wastewater technologies applicable in the tropics
- Establish circular economy principles for wastewater management
- Workforce development
- A locally-addressable factor to improve coral reef health

• Challenges & Opportunities

Challenges

- Geology & rainfall
- Rural Area
- Socioeconomic status of community
- Lack of visible problem for community

Opportunities

- Tight knit dedicated community engaged in planning
- Workforce development needed for community
- Dedicated partners for land acquisition
- Overall attitude of care for the ocean

WAI WASTEWATER ALTERNATIVES & INNOVATIONS



Questions?

kim.falinski@tnc.org

www.waicleanwater.org

info@waicleanwater.org

@waicleanwater